VEGETATION AND FLORA OF AMBROSE FEN

FLATHEAD COUNTY, MONTANA

Prepared for

The Nature Conservancy
32 South Ewing
Helena, MT 59601

Prepared by

Peter Lesica
929 Locust
Missoula, MT 59802

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Introduction Ambrose Fen occurs between Rose Creek and Highway 35, ca. 5 miles south of Creston in Flathead County (T28N R20W S27 E1/2, Fig. 1). It is 100-200 acres of fen and carr bounded on the northeast and west by spruce swamp forest. The presence of shallow pools and deep sink holes suggests that the peatlands are formed around and above springs. The source of water for these springs is likely the glacially formed uplands and kettle lakes immediately to the east. Most of the surrounding bottom land is used for agriculture or livestock grazing.

Ecological significance Ambrose Fen is one of the largest fen-carr complexes west of the Continental Divide in Montana. It supports six plant associations, including *Picea/Lysichitum americanum* swamp forest which is considered imperiled because of rarity in Montana and globally. The peatlands are very rich in species with many species of plants restricted to boreal mires throughout their range. Six species listed as vascular plant species of special concern by the Montana Natural Heritage Program occur in the peatlands: *Carex livida, C. paupercula, Cypripedium calceolus, Eleocharis rostellata, Scirpus cespitosus,* and *Utricularia intermedia*. A seventh species, *Viola renifolia,* is found in the adjacent swamp forest. The size and diversity of this peatland complex as well as the number of rare plants indicate that the Ambrose Fen is a biologically significant wetland feature in the Flathead Valley.

Ecological composition Wetlands on the Ambrose property can be classified into three types: (1) swamp forest, (2) carr, and (3) dwarf carr.

Swamp forest

***Picea/Equisetum arvense* plant association.** Forests are dominated by spruce (*Picea engelmannii* X *glauca*) and paper birch (*Betula payrifera*). Bog birch (*Betula glandulosa*) is locally common in the understory. Common ground layer species include *Rubus pubescens, Equisetum arvense*, and *Mitella nuda*. Examples of this type on the northeast side of the peatland have more open canopies and have been heavily impacted by livestock grazing and clearing for agriculture. The forest on the west side of the peatland is more protected from grazing and has suffered less disturbance. This association has been described for Montana by Pfister et al. (1977). G4-S4.

***Picea/Lysichitum americanum* plant association.** A large area of swamp forest below the big spring at the west end of the wetlands has an understory dominated by *Lysichitum americanum*, *Equisetum arvense* and *Athyrium filix-femina*. This association is prevalent in the lowest areas around the spring and along water courses. It has been described by Hansen et al. (1995) and Pfister et al. (1977). G2-S2.

Carr

***Betula glandulosa/Carex aquatilis* plant association.** Throughout the peatlands are dense stands of Betula glandulosa (bog birch) up to 2.5 m high. Other shrubs are uncommon. Common graminoids include *Eleocharis rostellata, Carex interior, C. diandra*, and *C. aquatilis*. The relatively high productivity of these stands may indicate an association with areas of improved aeration, perhaps caused by upwelling or more rapid drainage. Hansen et al. (1995) describe the *Betula glandulosa/Carex rostrata* habitat type; however, the ground layer at Ambrose Fen is notably different than the one they describe. This plant association has not been described or ranked by the Montana Natural Heritage Program.

***Betula glandulosa/Juncus balticus* plant association.** This carr community is also dominated by *Betula glandulosa*, but it is generally of lower stature, 1.5-2 mm high. *Salix candida* (hoary willow) is also common but is usually no more than 1 m high. Dominant ground layer species include *Juncus balticus, Carex lasiocarpa*, and *Menyanthes trifoliata*. This association is probably associated with less well-aerated peat than the previous type. Similar vegetation has been described for Pine Butte Fen (Lesica 1986). The *Salix candida/Carex rostrata* habitat type described by Hansen et al. (1995) has a ground layer dominated by coarse sedges rather than the more anaerobic-tolerant species observed in Ambrose Fen. This plant association has not been described or ranked by the Montana Natural Heritage Program.

Fen (dwarf carr)

***Betula glandulosa/Carex aquatilis* plant association.** This open dwarf carr or fen community has a low to moderate cover of the shrubs *Betula glandulosa, Potentilla fruticosa* and *Salix candida*, 0.5-1.5 m high. The ground layer is dominated by *Eleocharis*

rostellata, Carex buxbaumii, C. interior and *C. aquatilis*. Similar vegetation has been described by Lesica (1986) for Pine Butte Fen, although the dominant sedge was *C. simulata*. This dwarf carr vegetation shares many dominants with the carr vegetation described above; however, Potentilla fruticosa and Eleocharis rostellata are common in the dwarf carr and uncommon or absent in the carr. This plant association has not been described or ranked by the Montana Natural Heritage Program.

***Betula glandulosa/Scirpus acutus* plant association.** *Betula glandulosa, Potentilla fruticosa* and *Salix candida* are still common, but this association has the poorest representation of shrubs; most are less than 1 m high. Dominant graminoids are *Scirpus acutus, Scirpus cespitosus* and *Carex flava*. Similar vegetation has been described by Lesica (1986) for Pine Butte Fen. This plant association has not been described or ranked by the Montana Natural Heritage Program.

Six species of vascular plants listed as species of concern are known to occur in the Ambrose Fen, and an additional species occurs in the adjacent spruce forest. Five of these rare plants are circumboreal or nearly so in distribution. The remaining two species are widespread in North America. Four of the species are confined to peatlands throughout their range. *Carex lacustris*, another species of concern, may occur in openings in carr vegetation on the south side of the fen; however, all specimens observed were in vegetative condition so positive identification was not possible.

Carex livida (pale sedge) is a circumboreal species of peatlands. In North America it is found south to California, Wyoming, Michigan and New York. It is known in Montana from fewer than 20 sites in Flathead, Glacier, Lewis and Clark, Lincoln, Missoula, and Teton counties. It occurs in poorly aerated organic soils of fens at lower elevations. It is distributed throughout the fen communities at Ambrose Fen. G5-S2

Carex paupercula (poor sedge) is a circumboreal species, occurring in North America south to Washington, Utah and Colorado. In Montana it is known from fewer than 20 sites in Flathead, Lake and Missoula counties. It occurs in poorly aerated organic soils of fens at lower elevations. It is

reported to occur around the large spring at the west end of the fen at Ambrose Fen. G5-S2

Cypripedium calceolus (yellow lady's-slipper) is found throughout much of North America and parts of northern Europe. In Montana it is known ca. 20 sites in the western half of the state. It occurs in moist or wet soil in or along the margins of peatlands and wet meadows at low elevations. It occurs around the large spring at the west end of the fen at Ambrose Fen. G5Q-S2/3

Eleocharis rostellata (beaked spike-rush) occurs in southern Canada, most of the U.S. as well as the Caribbean and western South America. In Montana it is known from fewer than 20 sites in Big Horn, Flathead, Lake, Madison, Meagher, Park, Sanders and Teton counties. It occurs in wet calcareous soils, often associated with warm springs at low elevations. It is distributed throughout the fen communities at Ambrose Fen. G5-S2

Scirpus cespitosus (tufted clubrush) is a circumboreal species found south in western North America to Oregon, Utah and Montana. In Montana it is known from fewer than 20 stations in Beaverhead, Flathead, Powell and Teton counties. It occurs in wet organic soil at low to high elevations. It is distributed throughout the fen communities at Ambrose Fen G5-S2

Utricularia intermedia (flat-leaved bladderwort) is a circumboreal species occurring south in North America to California, Montana, Iowa, and Deleware. In Montana it is known from five sites in Flathead, Lincoln, Missoula, and Powell counties. It occurs in shallow water of peatlands at low elevations. A small colony of this plant was found in shallow depressions at the northeast end of the fen. G5-S1

Viola renifolia (kidney-leaved violet) is found from British Columbia to the eastern U.S. and south in western U.S. to Colorado. In Montana this plant is known from fewer than 20 sites in Flathead, Glacier, Jefferson, Lake, Missoula, Silver Bow, and Teton counties. It is found in moist soil, often associated with openings in swamp forest at low to mid-elevations. This species occurs in spruce forest on the west side of the fen. G5-S2

Management considerations The area is currently being grazed by cattle, apparently throughout the growing season. This practice may alter the microtopographic structure of the mire and could facilitate the spread of weeds such as *Cirsium arvense* and the introduction of *Sonchus* spp. Use of the area by livestock, especially during the spring and summer, should be curtailed.

Reed canarygrass (*Phalaris arundinacea*) is present in Ambrose Fen. Although there is no evidence that this species is spreading at this site, it formed monocultures in some peatland areas of the nearby Swan River Oxbow Preserve, severely degrading the fen plant community. The presence of reed canarygrass should be monitored to determine if it is increasing under present management conditions.

The ecological integrity and biological values of Ambrose Fen depend on the local hydrologic regime. The source of the water for the peatlands should be determined and protected. It is not known how the current plans to widen the adjacent Highway 35 will affect the local hydrology.

Literature Cited

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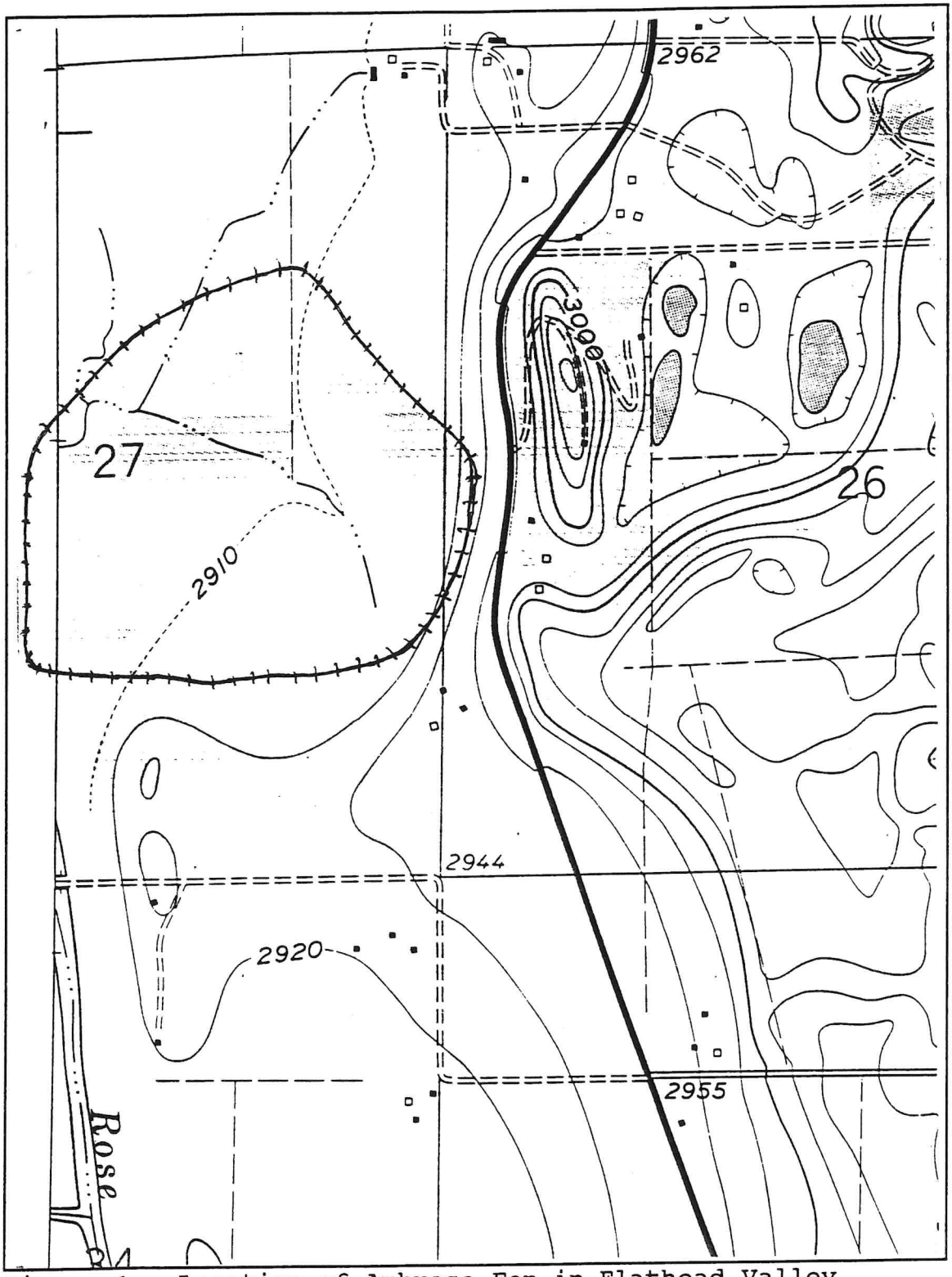

Figure 1. Location of Ambrose Fen in Flathead Valley

Appendix A. Vascular plants observed in Ambrose fen-carr complex and adjacent forests on 16 September 1994 and 27 June 1995. An asterisk (*) indicates introduced species. An "&" indicates a species reported by Maria Mantas. Nomenclature follows Hitchcock and Cronquist (1973).

ACERACEAE
Acer glabrum

APIACEAE
Angelica arguta
Cicuta douglasii
Heracleum lanatum &
Osmorhiza chilensis
Sanicula marilandica

ARACEAE
Lysicitum americanum

ARALIACEAE
Aralia nudicaulis

ASTERACEAE
Aster junciformis
Aster occidentalis
Cirsium arvense*
Cirsium vulgare*
Erigeron lonchophyllus
Petasites sagittatus
Senecio pseudaureus
Taraxacum officinale*

BALSAMINACEAE
Impatiens aurella

BETULACEAE
Alnus incana
Betula glandulosa
Betula occidentalis
Betula papyrifera

BORAGINACEAE
Cynoglossum officinale*&
Myosotis laxa

BRASSICACEAE
Cardamine pensylvanica

CAMPANULACEAE
Lobelia kalmii

CAPRIFOLIACEAE
Linnaea borealis
Symphoricarpos albus

CARYOPHYLLACEAE
Stellaria longipes
Stellaria media*

CORNACEAE
Cornus canadensis
Cornus stolonifera

CYPERACEAE
Carex aquatilis
Carex aurea
Carex buxbaumii
Carex capillaris
Carex concina
Carex diandra
Carex dioica
Carex disperma
Carex flava
Carex interior
Carex lacustris(?)
Carex lasiocarpa
Carex leptalea
Carex limosa
Carex livida
Carex paupercula &

Carex stipata
Carex utriculata
Carex vesicaria &
Eleocharis palustris
Eleocharis rostellata
Eleocharis tenuis
Eriophorum viridicarinatum
Scirpus acutus
Scirpus caespitosus
Scirpus microcarpus

DROSERACEAE
Drosera rotundifolia

EQUISITACEAE
Equisetum arvense
Equisetum fluviatile

ERICACEAE
Pyrola asarifolia

GROSSULARIACEAE
Ribes setosum

JUNCACEAE
Juncus balticus
Juncus covillei (?)
Juncus ensifolius
Juncus longistylis
Juncus nodosus

JUNCAGINACEAE
Triglochin maritima
Triglochin palustre

LAMIACEAE
Lycopus uniflorus
Mentha arvensis
Prunella vulgaris

LEMNACEAE
Lemna minor

LENTIBULARIACEAE
Utricularia intermedia
Utricularia minor

LILIACEAE
Smilacina stellata
Zigadenus elegans

LYTHRACEAE
Lysimachia thyrsiflora

MENYANTHACEAE
Menyanthes trifoliata

ONAGRACEAE
Circaea alpina
Epilobium palustre
Epilobium watsonii

OPHIOGLOSSACEAE
Botrychium virginianum

ORCHIDACEAE
Cypripedium calceolus
Habenaria dilatata
Habenaria hyperborea
Habenaria obtusata &

PINACEAE
Picea sp.

POACEAE
Agrostis alba
Bromus ciliatus
Calamagrostis inexpansa
Calamagrostis neglecta
Deschampsia cespitosa
Glyceria grandis
Glyceria striata
Muhlenbergia glomerata
Oryzopsis aspera
Phalaris arundinacea*
Poa palustris*

Trisetum canescens

POLYGONACEAE
Polygonum amphibium
Rumex occidentalis

POLYPODIACEAE
Athyrium filix-femina

PRIMULACEAE
Dodecatheon pulchellum
Lysimachia thyrsiflora

RANUNCULACEAE
Ranunculus uncinatus
Ranunculus sceleratus

RHAMNACEAE
Rhamnus alnifolia

ROSACEAE
Amelanchier alnifolia
Fragaria virginiana &
Geum macrophyllum
Geum rivale
Potentilla fruticosa
Potentilla palustris
Rosa acicularis
Rubus idaeus
Rubus pubescens

RUBIACEAE
Galium aparine
Galium boreale
Galium trfidum
Galium triflorum

SALICACEAE
Populus tremuloides &
Populus trichocarpa &
Salix bebbiana
Salix candida

SAXIFRAGACEAE
Mitella nuda

SCROPHULARIACEAE
Mimulus guttatus
Veronica americana

SOLANACEAE
Solanum dulcamara*

TYPHACEAE
Typha latifolia

VALERIANACEAE
Valeriana edule

VIOLACEAE
Viola canadensis
Viola nephrophylla
Viola renifolia